

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-25 are currently pending, and Claims 1-24 are amended.

The outstanding Official Action objected to Applicants' claim to priority; objected to Claims 16-22; rejected Claims 1-3, 7, 8, 10, 11, 13, 15-17, 19, and 20 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,563,909 to Nakazawa; rejected Claim 4 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of U.S. Patent No. 6,920,192 to Laroia et al. (hereinafter Laroia); rejected Claim 5 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa and Laroia, and further in view of U.S. Patent No. 4,606,047 to Wilkinson; rejected Claim 6 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa, Laroia, and Wilkinson, and further in view of U.S. Patent No. 7,035,612 to Kishimoto et al. (Kishimoto); rejected Claim 9 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of Kishimoto; rejected Claim 12 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of U.S. Patent No. 6,967,994 to Boer et al. (hereinafter Boer); rejected Claim 14 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of Kishimoto; rejected Claim 18 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of Wilkinson; rejected Claims 21 and 22 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of Kishimoto; and rejected Claims 23-25 under 35 U.S.C. § 103(a) as unpatentable over Nakazawa in view of Boer.

A certified copy of the priority document is submitted herewith. Applicants respectfully request that the objection to Applicants' claim to priority be withdrawn.

Applicants respectfully traverse the objection to Claims 16-22. Claim 15, from which Claim 16 depends, is directed to a method. Accordingly, Applicants submit that amending Claim 16 to recite a "determining means," as suggested by the outstanding Official Action, is

not required. Thus, Applicants respectfully request that the objection to Claims 16-22 be withdrawn.

Applicants respectfully traverse the rejection of the claims under 35 U.S.C. § 102(b) with respect to amended independent Claims 1 and 15.

Amended Claim 1 is directed to an antenna branch selector. The branch selector includes a controller coupled to a time-to-frequency domain converter and to a signal selector to control the signal selector to select an antenna from a plurality of antenna branches responsive to a measure of multipath fading for the signals determined from a corresponding frequency domain output signal.

Support for changes to Claim 1 is found in Applicants' Figure 8 and the corresponding written description in the specification. It is noted that Claim 1 is amended similar to Claim 15. The remaining changes to the claims address minor informalities.

Turning now to the applied reference, Nakazawa describes a radio communication system capable of measuring propagation characteristics of channels while the channels are in use. Figure 12 of Nakazawa illustrates antenna branches 56a to 56n each having a separate intermediate frequency (IF) branch stage working at a separate frequency.¹ The outputs of the IF stages are combined and a Fourier transform is applied to the combination. Based upon the frequency spectra, a propagation characteristic analyzing circuit 62 simultaneously analyzes propagation characteristics of the individual received signals.² Accordingly, Nakazawa describes building a frequency spectra of the individual received signals by using narrow band analysis.³

However, Nakazawa fails to disclose or suggest selecting "an antenna branch from said plurality of antenna branches responsive to a measure of multipath fading for the

¹ See Nakazawa at col. 11, lines 13-39.

² See Nakazawa at col. 12, lines 4-16.

³ See Nakazawa at col. 5, line 65 to col. 6, line 49.

received signals determined from said corresponding frequency domain output signal,” as recited in Claim 1. Nakazawa merely describes that the best received signal from the individual received signals is selected without describing the means of analyzing the best received signal. That is, Nakazawa merely states that the selection should be performed to select a received wave with excellent propagation characteristics.⁴ Thus, one of ordinary skill in the art, in light of Nakazawa, would be restricted to conventional measurements such as received power or the signal to noise interference ratio.

As discussed in Applicants’ specification at page 14, first paragraph, selecting an antenna branch on the basis of received signal power does not properly take into account the effect of signal interference and does not include the effects of intersymbol interference (ISI). Accordingly, in one non-limiting example of the present invention, the differences between the levels of the peaks above and below a carrier frequency of FFT energy spectra are measured, thereby providing a more accurate indication of channel fading than that based on conventional received signal power values.⁵

Accordingly, Applicants respectfully submit that Nakazawa fails to disclose or suggest selecting “an antenna branch from said plurality of antenna branches responsive to a measure of multipath fading for the received signals determined from said corresponding frequency domain output signal,” as recited in Claim 1.

Furthermore, Applicants respectfully traverse the assertion of the Official Action that column 6, lines 7-25 of Nakazawa discloses the feature of “determining a measure of multipath fading for the received signal from each antenna from said frequency domain transformed signal,” as recited in Claim 15.⁶ This cited portion of Nakazawa merely describes that power values of individual received signals with frequencies F_{T1} to F_{TM} are

⁴ See Nakazawa at col. 13, lines 47-46 and col. 14, lines 13-21.

⁵ See specification at page 15, line 24 to page 16, line 2.

⁶ See Official Action of April 3, 2007 at page 5.

output from a power calculating circuit. However, Nakazawa neither discloses nor suggests that a measure of multipath fading is determined from the calculated power levels of the received signals.

Accordingly, Applicants submit that Nakazawa fails to disclose or suggest all the features of Claims 1 and 15. Thus, Applicants respectfully request that the rejection of Claims 1-3, 7, 8, 10, 11, 13, 15-17, 19, and 20 under 35 U.S.C. § 102(b) be withdrawn.

Applicants respectfully traverse the rejections of Claims 23 and 24 under 35 U.S.C. § 103(a). Claims 23 and 24 have been amended to recite “selecting a received signal responsive to a received signal parameter.” Support for this change is found in the specification at least on page 21, lines 27-30. Thus, no new matter is added.

Claim 24 is directed to a method of selecting a received signal from an antenna of an antenna system. The method includes selecting a received signal responsive to a received signal parameter measured during a preamble signal. The method further includes determining a Doppler frequency change of the received signal. The method also includes reselecting the received signal during a payload signal conditional upon the determined Doppler frequency change being greater than a threshold frequency change.

The outstanding Official Action acknowledges that Nakazawa fails to disclose or suggest “reselecting said received signal during said payload signal conditional upon said determined Doppler frequency change being greater than a threshold frequency change.” To cure this deficiency, the outstanding Official Action relies on Boer.⁷

Turning now to the applied reference, Boer describes a method for selecting a preamble based on a measured signal quality. Boer describes that a signal detected in a toggled antenna and the signal quality is compared to a threshold.⁸ Boer describes that

⁷ See Official Action of April 3, 2007 at pages 16 and 17.

⁸ See Boer at col. 5, lines 4-10.

antenna diversity is implemented to select the strongest detected signal.⁹ In response to the comparison, a short preamble or long preamble processing is selected and used, and subsequently, an appropriate process for the short preamble or the long preamble is started.¹⁰

However, Boer fails to disclose or suggest “reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change,” as recited in Claim 24. Further, Applicants respectfully traverse the assertion in the outstanding Official Action that column 3, lines 36-53 of Boer discloses that feature.¹¹ This cited portion of Boer merely describes selecting a short or long preamble based upon comparing a measured signal quality (Q_{RX}) with a threshold ($T_{preamble}$).

However, Boer fails to disclose or suggest that the measured signal quality is a “determined frequency change.” Furthermore, the threshold ($T_{preamble}$) is merely associated with the measured signal quality (Q_{RX}) instead of a “threshold frequency change.”

Furthermore, Boer is concerned with adapting a transmitted signal and selecting appropriate preamble lengths. Boer neither discloses nor suggests the method for switching from one antenna to another antenna during reception of a data packet “conditional upon said determined frequency change being greater than a threshold frequency change.”

Furthermore, there is no indication that the thresholds described in Boer are based on anything other than signal to noise ratio, signal strength, or signal peak value.¹²

Accordingly, Applicants submit that Boer fails to disclose or suggest all the features of Claim 23. Additionally, Boer fails to disclose or suggest “reselecting said received signal during said payload signal conditional upon said determined frequency change being greater than a threshold frequency change,” as recited in Claim 23. As Nakazawa fails to cure the deficiencies of Boer, as acknowledged by the outstanding Official Action, Applicants submit

⁹ See Boer at col. 4, lines 45-47; col. 5, lines 24-27; and Fig. 1.

¹⁰ See Boer at col. 5, lines 20-30.

¹¹ See Official Action of April 3, 2007 at page 17.

¹² See Boer at col. 3, lines 48-53 and col. 6, lines 30-35.

that Nakazawa and Boer fail to disclose or suggest all of the features of Claim 23 and 24.

Thus, Applicants respectfully request that the rejection of Claims 23 and 24, under 35 U.S.C. § 103(a) be withdrawn.

The outstanding Official Action rejected Claims 4-6, 9, 12, 14, 18, 21, 22, and 25 under 35 U.S.C. § 103 as unpatentable over Nakazawa, Laroia, Wilkinson, Kishimoto, and Boer.

As outlined above, Nakazawa fails to disclose or suggest all the features of Claims 1 and 15, from which Claims 4, 9, 12, 14, and 18 depend. Applicants have considered the applied art and submit that Laroia, Wilkinson, Kishimoto, and Boer fail to cure the deficiencies of Nakazawa. Accordingly, Applicants submit that a *prima facie* case of obviousness has not been presented.

Thus, Applicants respectfully request that the rejections of Claims 4-6, 9, 12, 14, 18, 21, 22, and 25 under 35 U.S.C. § 103(a) be withdrawn.

Accordingly, Applicants respectfully submit that independent Claims 1, 15, 23, and 24, and the claims depending therefrom, are allowable.

Consequently, in view of the present response, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. A notice of allowance is earnestly solicited.

Respectfully submitted,

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